

1. Introduction

This Note is to provide guidance for the inspection of Roofs, Balconies and Walkways prior to the specification and use of Liquid Applied Waterproofing Systems (LAWS).

Initial inspection is a critical part of the process and should involve the building owners' representative and the LAWS manufacturers' representative. A contractors' representative is usually involved at a subsequent inspection stage, which may be a repeat of the initial inspection.

An inspection is potentially a dangerous operation and everyone should be aware of the condition and situation on the roof. If there is any doubt about the structural integrity of the roof, balcony or walkway or any part of it, then these areas must not be accessed - seek professional advice from a competent person and see Section 2 below.

Relevant parts of the inspection cover both condition and suitability for a LAWS prior to preparation of a client specification. It is also important to include ancillary items, often located on flat roofs in particular, if an integral part. Following these specifications include the client's specific requirements, plus any special and/or regulatory items.

2. Access

Roofs, balconies and walkways that require re-waterproofing need inspection in order that the current condition and suitability may be assessed. For this purpose the site should be treated as a work place and appropriate safe access needs to be provided. It is essential that an adequate ground level review and risk assessment is conducted before any attempt is made to gain access at roof level.

Access to roof, balcony or walkway level may be gained by an exterior route, e.g. ladder or fixed stairway, or alternatively by internal fixed staircase. Whichever route is selected the safety of all persons must be ensured. On sites which are vacant, roof or roof walkway inspections should not be conducted by unaccompanied persons, and even on working premises local personnel should be advised that there will be an inspection, and notified on completion.

Prior to any traffic at roof or walkway level those conducting the inspection should establish the structural integrity of the roof either by local enquiry or by observation and carry out a risk assessment. In cases of doubt all roofs must be considered fragile and not load bearing. In these cases inspection must be confined to a visual inspection from the perimeter without accessing the roof.

If further inspection is required, then this must be conducted in accordance with the requirements of the ACR[CP]002:2005 "Best Practice Guide – Guidance Note for Safe Working on Fragile Roofs" – Green Book. http://www.roofworkadvice.info/Fragile_CP0022005_camera_ready_copyamended_May06.pdf. No attempt to inspect a fragile roof or walkway on the roof should be undertaken by walking along lines of fixings.

On the assumption that access may be gained to a load-bearing roof or roofing walkway, care should be taken to confine activity to areas away from edges without parapets above 1m in height, and in areas where there are rooflights or other potentially fragile roof structures. All rooflights must be considered fragile.

If reasonable and safe access is not possible then any survey should be arranged after the erection of scaffold or scaffold towers and the provision as required of crawling boards. The use of Mobile Elevating Work Platforms (MEWP's) or scissor lift may provide an alternate mode of examination.

For further information on Health and Safety on roofs, balcony and walkways, consult LRWA Guidance Note No. 5.

3. Identification

It is important to correctly identify existing roof, balcony and walkway construction and finishing materials. Incorrect identification can be dangerous for operatives working on the roof and may lead to an incorrect specification or application method for remedial works.

The initial examination of the roof, balcony or walkway should involve detailed discussions with the property owner/agent and, if possible, a review of existing drawings and paperwork. This should be followed by a thorough internal inspection of the underside of the roof paying particular attention to evidence of deterioration or corrosion.

Identifying the construction of the support structure is a critical part of the risk assessment conducted prior to accessing the roof.

Particular care should be taken with the following sub-structures;

- Asbestos/fragile roofs must not be accessed under any circumstances. Suitable access equipment is required or walkways complemented by a fall arrest system.
- Strawboard, chipboard and un-reinforced woodwool slabs, are all highly susceptible to deterioration, and are listed as fragile by HSE
- Profiled metal sheeting may become weakened by corrosion. Sheets should be inspected from the underside since severe corrosion is frequently not visible from above.
- Rooflights must be identified taking particular care to ensure they have not disappeared from view having been previously coated. Additional precautions may need to be incorporated to prevent any one accidentally stepping onto the rooflight e.g. safety guardrails or edge protection.

Having identified an area as safe to access or provided a safe platform from which to work, a core sample can be removed to determine the exact make up of the roof. Assumptions must not be made that the remainder of the roof, balcony or walkway is of the same makeup or condition as the core without overall investigation.

External surface of the roofs, balconies and walkways

Identifying the external surface is a far more complex task than it was only a few years ago. For example the range of coatings applied to corrugated metal roofs, balconies or walkways is considerable as is the range of polymers referred to under the title 'single ply roofing'. Where definite identification is not possible the use of adhesion tests and the possibility of the removal of a sample must be considered, in order to assess the suitability of the proposed Liquid Applied Waterproofing System.

Roof, balcony and walkway design

The thermal properties and condensation control provisions of the roof, balcony and walkways must be identified. Any proposed works must take into account the requirements of the building regulations, in particular Approved Document L, which may require the thermal performance to be upgraded. Cold roofs should be eliminated wherever possible by the application of thermal insulation to convert to a warm roof construction.

Warm roof designs incorporating a vapour barrier to the warm side of the insulation are almost impossible to identify without opening up the roof, which can ruin the integrity of the vapour barrier. Reliance on existing drawings and previous specifications is crucial. The opening up of the roof may be impossible to avoid when it is considered necessary to check the water content of the insulation to confirm the effectiveness of the vapour barrier. Provision must also be made to make good the area and thoroughly seal any holes after the inspection has been carried out. The use of thermal imagery and capacitance leak detectors to identify the condition of the substrate is an alternative way of assessing these factors without compromising the existing waterproofing.

It is important to identify other factors relative to the roof, balcony or walkway such as:

- Level of exposure to prevailing weather conditions
- Locality to adjacent buildings which may be affected by ongoing works, such as solvent emissions and fire

4. Condition

Having established the type of substrate and the construction of the roof, balcony or walkway deck, it is now necessary to look at the condition of the existing waterproofing membrane and/or the decking material.

Visual inspection from the access point will indicate if there is any significant deflection of the deck.

Deflection could indicate that the deck screed or insulation have become wet and are no longer stable or that the decking material is over spanned.

Having established that the deck is in a stable condition and it is safe to walk on, look at the condition of the existing roof, balcony or walkway deck or waterproofing membrane applied to it and consider the following:

- Is there ponding water?
- Is there evidence of dried puddles and associated debris/organic growth?
- Is there damage – if so what sort (torn, cracked, slumped, for example)?
- Will the condition of the upper surface give rise to concern regarding cleaning methods if it is judged the Liquid Applied Waterproofing System is to be directly applied?
- If the roof is to be pre-boarded or a carrier membrane laid will the design lend itself to this?
- Is the upper surface an integral part of the deck loose laid, or bonded (wholly or partially)?
- If there is an existing coating on the upper surface?
- If there are any existing patch repairs indicating previous leaks or local defects?
- If there are surface items such as chippings which need removal?

Already Leaking?

The client or building occupants will be able to advise if the roof, balcony or walkway is leaking and possibly the whereabouts of any ingress.

If the roof, balcony or walkway is leaking it will be necessary to determine the source of water ingress, which might be through defects in the waterproofing membrane, the deck, or through associated details or flashings etc, and these should be noted for repair or replacement.

Common defects found are cracks or splits, blisters in the membrane and/or the presence of trapped moisture.

If moisture is detected, trapped within the existing construction, it may be a result of leaks that may have been patched already, or it could be due to condensation.

Moisture can be detected in various ways from the use of a Protimeter, through to thermal imagery and results can be confirmed by the taking of a core sample.

Insulation and Vapour Control

A core sample will also determine the presence or absence of a vapour control layer.

If there is insulation either below or above deck, determine type and thickness and if it is in a dry and stable condition.

In the case of a warm roof, type and thickness can only be established by cutting out a core sample through the construction.

In the case of trapped water, provision must be made to enable trapped low levels of water to dry out, or the wet areas must be cut out and replaced prior to the installation of a LAWS.

In the case of condensation this can be a result of any one or a combination of the following:

- Insufficient insulation – more insulation can be added
- Excessive humidity or wet processes in the building below

- Lack of ventilation in the roof void – provide ventilation or consider adding insulation to convert the construction to a warm roof
- Lack of a sufficient vapour control layer – it will normally be necessary to remove the existing system and replace with a sound vapour control layer, insulation and LAWS

The condition of the substrate will determine the correct level of preparation needed prior to the installation of a LAWS.

NB: it should also be noted that to comply with Approved Document L of the Building Regulations (The Conservation of Fuel and Power), it may be necessary to increase the level of insulation prior to applying the LAWS.

5. Inspecting Ancillary Items

These are external items other than the principal roof, balcony or walkway deck, and may be on, within or ancillary to it. They commonly include:

- plinths for equipment mounting – air-conditioning units; pipe supports
 - gutters – valley type or edge mounted
 - drains – throated drains leading to internal downpipes
 - vents and air intakes – through the roof or via fan housings
 - rooflights – northlight structures, flat types
 - upstands – capped with copings or trims
 - flashings – termination of existing deck or membrane
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- lightning conductors – NEVER COATED, other than supports
 - walkways and stairways – various constructions and mountings
 - protrusions – bolts in sheet roofs, lifting gear
 - safety equipment such as ‘Safety Cable systems’ etc

Condition of these items forms part of the overall inspection as they may be included in the scheme as part of the necessary waterproofing and formation of the seamless LAWS system. If the source of the roof leak is unknown it must be assumed that the ancillary items will be included within the LAWS.

A further reason for inclusion is if the roof is subject to water tanking or ponding and the LAWS is required to form a containment tank to prevent overflow into or onto the ancillary items.

The items should be inspected as to their soundness to accept a newly applied LAWS. Any badly holed, completely distressed, rotten, rusted through, badly fitting or loose items will need either replacement or repair to support the LAWS. Look also for joints which no longer join or have sprung; cracks between the deck and upstands, or if a bridging fillet may be needed e.g. between deck and upstand and blocked drains or gutters. Identify differing substrates which may require different levels of preparation or pre-priming and if any require different cleaning methods from the main deck. Termination points will be needed for the LAWS and these should be identified. If lightning conductors or electrical cabling are present, a plan to lift and support them is needed so the LAWS can be applied below before they are re-laid. Check suitability of drain throats to accept the LAWS and if gutters are sound overall and whether the joints and the falls are correct. Walkways which are loose laid can be replaced by LAWS, or re-laid over the applied coating.

The following two examples illustrate some of these points:

- The inclusion in the coating scheme of valley gutters because they are suspected of leaking, and/or as a means of continuing the seamless LAWS across the roof.
- The inclusion of plinths, part of or laid on the principal deck where the sides would be coated as part of the formation of the LAWS ‘tank’. A further possibility is if cracks are present at the juncture of the plinth and the deck, or in the plinth which could be part of the leakage problem.

Further references can be found in the LRWA Code of Practice and in Guidance Note No. 2 ‘Substrates for Liquid Applied Waterproofing Systems for Roofs, Balconies and Walkways’.

6. Client Requirement

Prior to preparing the LAWS specification, it is essential to establish exactly what requirements the client has and their expectations of the work being requested. This allows all factors to be considered in making the correct choice of LAWS to specify. The following should be considered:-

- i) Identify what the client requires, having briefed them on the inspection.
- ii) Does the client have any special requirements that the specification has to meet other than providing waterproofing and weather protection, i.e. requires a particular colour, surfaces to take regular foot traffic, extra insulation to comply with Part L of the Building Regulations (if unsure ask Building Control), will there be a subsequent change of use etc?
- iii) Does the client have any restrictions that prevent the use of certain materials on site, i.e. flammable liquids, solvent fumes and odours or no hot work.
- iv) Establish whether there is a "permit to work" system requirement to follow. The client's site practices should be identified and agreed.
- v) Establish whether there are any specific safety requirements that the client imposes on site. Understand what arrangements are available, if any, for storing LAWS materials on site. If not make provision which may include storage at a minimum temperature.
- vi) Are there any restrictions imposed by third parties, i.e. clients insurers, local authority, Environmental Agency?
- vii) Advise client that CDM Regulations may apply (job size dependent) and they may have responsibilities under these regulations.
- viii) Advise client if additional insulation is required to comply with Part L of the Building Regulations, or to double-check with Building Control if in doubt.
- ix) Identify and agree with the client the life span (minimum) expected of the LAWS to be specified. Identify whether the client requires a written certified guarantee, possibly including an Insurance backed guarantee, for the system, and/or whether a Maintenance Agreement is necessary. Terms and conditions should be established. If possible, establish with the client the budget that is available for completion of work required.
- x) Identify when the client would like the work to commence. This is important, as it will provide an indication of the weather conditions that are likely to prevail during application. Consideration should be given to rain, frost, temperature extremes etc and consequently allow for correct choice of LAWS.
- xi) Advise client that roof refurbishment is required to comply with Part L of the Building Regulations, and that an upgrade of the thermal insulation may be required, and the advice of the local building control officer must be sought prior to proceeding with any works.

The completed specification should be sent to the Client's named contact in a method statement listing the full description of the proposed LAWS to be applied and the repairs to be carried out. It should include specific references to the relevant details listed above where applicable. It should also be accompanied by the manufacturer's Technical Data and MSDS information.

7. Ancillary Information

- Make reference to the LRWA Code of Practice.
- Check manufacturer's reputation, systems certification and validity.
- Guarantees may require that inspections be carried out at regular intervals.
- Maintenance requirements as laid down by the owner, contractor or manufacturer must be respected.
- REFER TO LRWA MEMBERS FOR SYSTEMS AVAILABLE.

LRWA was founded in 1979, and consists of the UK's leading manufacturers of liquid roof coatings and related material suppliers. It aims to raise awareness about the technical and financial benefits of specifying liquid applied roofing systems and to establish both product and installation standard to ensure optimum performance is achieved; to this end LRWA has been involved in the writing of European Technical Approvals as the official body in conjunction with the BBA and EOTA.

Whilst every effort has been made to ensure the accuracy of the information contained in this publication, it must be emphasised that the Association has itself not verified the information by independent testing: for this reason and because the Association has no control over the precise circumstances in which it will be used the Association, its officers, employees and members can accept no liability arising out of its use, whether by members of the Association or otherwise. The publication is of a technical nature only and makes no attempt to state or conform to building regulations or other legal requirements; compliance with these must be the individual user's own responsibility.